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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte PAUL HAEFNER

Appeal 2009-005193
Application 10/784,478
Technology Center 3700

Decided: March 2, 2010

Before MICHAEL W. O'NEILL, KEN B. BARRETT, and
FRED A. SILVERBERG, *Administrative Patent Judges*.

SILVERBERG, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Paul Haefner (Appellant) seeks our review under 35 U.S.C. § 134 of the final rejection of claims 1-19 and 30-36. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

SUMMARY OF DECISION

We REVERSE.

THE INVENTION

Appellant's claimed invention is directed to a cardiac signal detection arrangement and method used with a subcutaneous cardiac monitoring and/or stimulation device (Spec. 8: 19-Spec. 9: 2).

Claims 1 and 30, reproduced below, are representative of the subject matter on appeal.

> 1. A signal separation method, comprising:
> detecting a composite electrical signal at a subcutaneous non-intrathoracic location, the composite electrical signal associated with a plurality of sources;
> receiving information associated with a non-electrophysiological cardiac source;
> separating a signal from the composite electrical signal using source separation; and
> verifying that the separated signal is a cardiac signal using the separated signal and the non-electrophysiological cardiac source information.
>
> 30. An implantable device, comprising:
> means for subcutaneously detecting a composite electrical signal associated with a plurality of signal sources;
> means for subcutaneously detecting non-electrical cardiac activity;
> means for separating a signal from the composite electrical signal using source separation; and
> means for determining whether or not the separated signal is a cardiac electrical signal using the detected non-electrical cardiac activity.

THE REJECTIONS

The Examiner relies upon the following as evidence of unpatentability:

Diack	US Re. 30,750	Sep. 29, 1981
Yomtov	US 5,388,578	Feb. 14, 1995
Wells	US 2003/0032889 A1	Feb. 13, 2003
Joo	US 2005/0240234 A1	Oct. 27, 2005

The following rejections by the Examiner are before us for review:

1. Claims 1, 4, 7, 8, 10, 16-19, 30, 31 and 34-36 are rejected under 35 U.S.C. § 102(b) as being anticipated by Diack.
2. Claims 1-13, 16-19 and 30-36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Yomtov in view of Joo.
3. Claims 1-13, 16-19 and 30-36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Joo in view of Yomtov.
4. Claims 14 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Diack in view of Wells; Yomtov in view of Joo, and further in view of Wells; and Joo in view of Yomtov, and further in view of Wells.

ISSUE

The issue before us is whether the Examiner erred in finding that Diack alone, or the combined teachings of Yomtov and Joo would have led a person having ordinary skill in the art to separating a signal from the composite electrical signal using source separation as called for in independent claims 1 and 30 (Reply Br. 10. 13, 18; App. Br. 9, 16).

ANALYSIS

Rejection of claims 1, 4, 7, 8, 10, 16-19, 30, 31 and 34-36 under 35 U.S.C. § 102(b) as being anticipated by Diack; and claims 1-13, 16-19 and 30-36 under 35 U.S.C. § 103(a) as being unpatentable over Yomtov in view of Joo or Joo in view of Yomtov

Appellant contends that neither Diack, Yomtov or Joo describe separating a signal from a composite electrical signal using source separation as called for in independent claims 1 and 30 (Reply Br. 10. 13, 18; App. Br. 9, 16).

Appellant contends that "one having ordinary skill in the art would recognize that signal source methodologies . . . are characterized by separating composite signals according to their respective sources." (App. Br. 10).

Appellant contends that the Specification describes that "signal *source* separation of a composite signal involves separating a signal from the composite signal according to the *source* of the signal (*See* Page 26, Line 27-Page 27, Line 4 of Appellant's Specification)." (emphasis original) (App. Br. 10).

Appellant contends that Yomtov's R-wave detector's separation of the R-wave form P, Q, S and T waves is not source separation as the signal comes from the same source (the heart) (Reply Br. 13, 14).

The Examiner found that

> the claim language does not require total attenuation, but only separation. The Examiner is of the position that reduction of external interference is still source separation because the desired signal is discerned from the undesired noise. Due to an absence of any "special definitions" in the specification, the Examiner

> maintains the broadest reasonable interpretation of "source separation."

(Ans. 15).

The Examiner found that Diack describes "[s]eparating a signal from the composite signal using source separation . . . (col. 19, lines 1-3)." (Ans. 3).

The Examiner found that Yomtov describes "separating a signal from the composite signal . . . (element 96 . . .)." (Ans. 11).

The Examiner found that Yomtov's "R-wave detector separates the R-wave source from the other ECG features (such as P, Q, S, and T waves) . . . [, and] [a]lthough Yomtov does not disclose the phrase 'source separation,' the Examiner maintains that this separation of the R-wave from the other features of the ECG reads on the claim language." (Ans. 16).

The Examiner found that Joo describes "separating a signal from the composite signal using source separation (par. 0059, the signal is filtered)." (Ans. 12, 13).

Claim 1 calls for, *inter alia*, "the composite electrical signal associated with a plurality of sources; . . . separating a signal from the composite electrical signal using *source separation*." (emphasis added).

Claim 30 calls for, *inter alia*, "a composite electrical signal associated with a plurality of signal sources; . . . means for separating a signal from the composite electrical signal using *source separation*." (emphasis added).

Appellant's Specification describes that

> [(a)] cardiac signals collected from subcutaneously implanted electrodes may be corrupted by noise … [(b)] certain noise sources have frequency characteristics similar to those of the cardiac signal. . . . [(c) d]ue to the possibility of relatively

> high amplitude of the noise signal and overlapping frequency content, *filtering alone does not lead to complete suppression of the noise.*

(emphasis added) (Spec. 25: 13-21).

Appellant's Specification further describes that

> [t]he main principle of signal separation rests on the premise that spatially distributed electrodes collect components of a signal from a common origin (e.g., the heart) with the result that these components are strongly correlated to each other in time. In addition, these components may also be weakly correlated to components of another origin (e.g., noise). An ITCS[1] device may be implemented to separate these components according to their sources.

(Spec. 26: 27-Spec. 27: 6).

We look to the dictionary to provide us with the ordinary meaning of the phrase "source separation." The ordinary meaning of "source" includes "a point of origin or beginning."[2] The ordinary meaning of "separation" includes "the act or process of separating: the state of being separated."[3] A person having ordinary skill in the art would understand the phrase "source separation," as called for in independent claims 1 and 30 and in light of Appellant's Specification[4] and the ordinary meanings of the words used in the phrase, to refer to separating a composite signal according to its point of origin, that is, separating a composite signal that includes signals from

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[1] An implantable transthoracic cardiac sensing and/or stimulation (ITCS) device is a subcutaneous cardiac monitoring and/or stimulation device (Spec. 8: 19-Spec. 9: 2).
[2] MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY (10th ed. 1999).
[3] *Id.*
[4] Spec. 26: 27-Spec. 27: 6.

different sources (different points of origin, e.g., heart, noise) into signals from each source (point of origin). This is consistent with Appellant's Specification. *See In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364 (Fed. Cir. 2004) (When construing claim terminology in the United States Patent and Trademark Office, claims are to be given their broadest reasonable interpretation consistent with the specification, reading claim language in light of the specification as it would be interpreted by one of ordinary skill in the art.).

The Examiner found that "bandpass filtering is 'source separation' because it removes unwanted sources (noise) from the desired source." (Ans. 15).

Appellant contends that the Examiner's interpretation of the claim term "source separation" as including band pass filtering is in error (App. Br. 11).

We look to the dictionary to provide us with the ordinary meaning of the word phrase "band-pass filter."[5] The ordinary meaning of the phrase "band-pass filter" includes "a filter that transmits only frequencies within a selected band."[6] A person having ordinary skill in the art would understand that a band-pass filter, while transmitting only frequencies within a selected band, the selected band may not be limited to a single (point of origin) source and could include frequencies from multiple sources.

The Examiner has not found that there is no overlap of frequencies in the claimed composite signal such that band pass filtering would separate the composite signal into signals from a single source.

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[5] Also referred to in this opinion as "bandpass" and "band pass."
[6] MERRIAM-WEBSTER'S COLLEGIATE DICTIONARY (10th ed. 1999).

Therefore, as the frequencies transmitted by a band pass filter could be from multiple sources, band-pass filtering does not separate the signal according to its origin, that is, according to its source. Therefore, band pass filtering is not "source separation."

Diack describes monitoring circuitry including a band pass filter 110 (col. 18, l. 40-col. 19, l. 16).

As band pass filtering is not "source separation," Diack does not describe "source separation" as called for in claims 1 and 30.

Accordingly, Diack does not anticipate independent claims 1 and 30. For the same reasons, Diack does not anticipate claims 4, 7, 8, 10, 16-19, 31 and 34-36, which depend from claims 1 and 30, respectively.

Yomtov describes that the beginning of a heart beat is initiated by a P wave and following the P wave is there is an ECG wave form (col. 7, ll. 27-37), the ECG wave form includes a QRS complex comprising a Q wave, an R wave, and an S wave, wherein the S wave is followed by a T wave (col. 7, l. 38-col. 8, l.4). Yomtov further describes that "[t]he R wave *generally* has an amplitude greater than any other waves of the ECG signal." (emphasis added) (col. 7, ll. 42-46). Yomtov still further describes using a band pass (filtering) differentiating function for eliminating the P wave and the T wave from the ECG (col. 14, ll. 6-49).

All of the P, Q, R, S, and T waves originate from the heart and, therefore, are from the same source. Since claims 1 and 30 call for the composite electrical signal to be associated with a plurality of sources, any separation of the P, Q, R, S, and T waves from each other does not describe source separation of a signal from *a composite signal associated with a plurality of sources* as called for in independent claims 1 and 30.

Further, as band pass filtering is not "source separation," Yomtov's use of a band pass (filter) differentiating function also does not describe "source separation" as called for in claims 1 and 30.

Joo describes using a bandpass filter 34, 54 to filter out noise (p. 4, para. [0052] and p. 5, para. [0059]).

Again, as band pass filtering is not "source separation," Joo does not describe "source separation" as called for in claims 1 and 30.

Since neither Yomtov nor Joo describes "source separation" of a signal from a composite signal associated with a plurality of sources, we conclude that the combined teachings of Yomtov and Joo do not describe "source separation" as called for in independent claims 1 and 30.

Therefore, we conclude that the Examiner erred in rejecting independent claims 1 and 30 over Yomtov in view of Joo or Joo in view of Yomtov. Likewise, the Examiner erred in rejecting claims 2-13, 16-19 and 31-36, which depend from independent claims 1 and 30, respectively.

Rejection of claims 14 and 15 under 35 U.S.C. § 103(a) as being unpatentable over Diack or Yomtov in view of Joo, or Joo in view of Yomtov, and further in view of Wells

The Examiner has not relied on Wells for any teaching that would remedy the deficiency in Diack or the combined teachings of Yomtov and Joo (Ans. 14). We thus conclude that the Examiner also erred in rejecting claims 14 and 15 as being unpatentable over Diack in view of Wells, or over the combined teachings of Yomtov and Joo in view of Wells.

CONCLUSION

The Examiner has erred in finding that Diack alone or the combined teachings of Yomtov and Joo would have led a person having ordinary skill

in the art to separating a signal from the composite electrical signal using source separation as called for in independent claims 1 and 30.

DECISION

The decision of the Examiner to reject claims 1-19 and 30-36 is reversed.

REVERSED

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